

Goal 2

Key Theme – Food Safety

Wyoming

(Based primarily on three programs: *Cent\$ible Nutrition Program [CNP]*; *Wyoming Food Safety Coalition [WFSC]*, a 70-member partnership that includes 20 trained teams consisting of a UWCES Family and Consumer Sciences educator and a health inspector who together conduct food-safety workshops with local food handlers; and *USDA Food Safety and Quality Multi-State Project: Value and satisfaction with food safety training in the Intermountain West*)

A joint project between faculty in Animal Science and Molecular Biology has developed a more effective antibiotic useful in protecting foods stored at low temperature from growth of bacteria that can cause human disease. Impact – Pediocin, a peptide produced by a common bacterium, can prevent the growth of other, pathogenic bacteria. UW scientists have cloned the gene for this peptide and used genetic mutations to increase its effectiveness. They are now investigating the mode of action of the antibiotic to facilitate making other changes to further increase the effectiveness and block acquired resistance in *Listeria*, the target organism.

CNP: 64 percent of homemakers showed improvement in one or more of the food safety practices. On entry surveys, 30 percent of participants demonstrated acceptable practices, in contrast to 56 percent on exit surveys.

WFSC: Based on follow-up surveys from 175 workshop participants (62 percent response rate): 97 percent made at least one change related to cleanliness, for example, 74 percent wash their hands more thoroughly; 78 percent made at least one change related to food preparation, for example, 55 percent thaw food in the refrigerator or under running water; 70 percent made at least one change related to cooking food, for example, 52 percent use a thermometer to check if a food is cooked or reheated enough; 80 percent made at least one change related to cooling food, for example, 54 percent put food into shallow containers or cutting meat into smaller pieces before putting it in the refrigerator; and 75 percent made at least one change related to other miscellaneous areas, for example, 54 percent inspect incoming food more closely.

USDA Food Safety and Quality Multi-State Project: The following results were documented: Approximately 75 percent of respondents had some type of food safety training in place, 67 percent were satisfied with the training received, 72 percent of managers said they would be more likely to hire food-safety trained workers, 50 percent would be willing to pay a higher wage to those trained, and customer satisfaction and image were the most important issues to the surveyed businesses.

West Virginia Extension

The Serv Safe course was offered at five locations throughout West Virginia; One hundred forty-six food service managers and workers participated in the five ServSafe courses statewide. All completed the exam and 134 met the certification requirements.

Wisconsin Extension

As a result of Wisconsin Nutrition Education Program food safety education:

- 439 participants (31% of those trained) said they would wash their hands more thoroughly;
- 248 individuals (21%) said they would improve their food handling practices to prevent cross-contamination;
- 113 adults and seniors (16%) indicated they would do a better job of cooking and reheating foods to proper temperatures;
- 198 adults and seniors (28%) said they would adopt safe practices for cooling leftovers;
- 120 young children and youth (23%) said they were more likely to wash fruits and vegetables before eating them; while 66 (16%) said that they would keep shoes and backpacks off countertops and tables to avoid cross-contamination.

Washington Extension

a. Hand washing is a key, often overlooked, behavior important for disease prevention and food safety. Our hand washing display, Germ City, is a large, walk-through tunnel equipped with black lights developed by Washington State University food safety educators. Germ City provides immediate feedback regarding the thoroughness of hand washing. Educators squirt a small dab of the "glo-germ" lotion onto the hands of participants before they walk through the tunnel. The lotion glows under the black lights. After the educator gives tips on hand washing, participants wash their hands and then re-enter the tunnel and see how effectively they have removed the "germs".

b. Impact: More than 40,000 children and adults participated in the Germ City exhibit or in other hand washing educational programs. More than 90% reported that they gained knowledge about correct hand washing procedures. It is estimated that about 40% of these changed their hand washing procedure after participating in the displays.

Virginia Combined Research and Extension

Virginia Cooperative Extension conducted two acidified foods workshops (multi-state cooperation) in Virginia and West Virginia to allow companies to meet FDA regulations. All the participants received certification and registered their products with FDA. Without this certification these companies could not continue to stay in business. Inspection of the facilities by food regulators indicate that 100% of the participants trained are following procedures learned in the workshops.

Texas 1862 Extension

There were 113 County Extension Agents who achieved or maintained certified instructor status for Food Protection Management. As a result of taking the Texas Agricultural Extension Service Food Protection Management course, food managers were expected to train their food service employees in safe food handling practices. Therefore, a telephone survey was conducted by the

Public Policy Research Institute (PPRI) at Texas A&M University to determine the practices of food service employees both before and after the managers had taken the course. This survey involved a sampling of food service managers (378) who had taken the Texas Agricultural Extension Service Food Protection Management course. The survey found that 95% of the participants had shared the information gained from the course with their food service employees, and the results are as follows:

Food Safety Practices Course	Before Course	After
<i>Outcome Indicator: Using thermometers and other control measures to monitor temperatures of foods</i>		
Employees use a thermometer to determine if foods have reached a safe internal temperature.	38%	72%
Employees always reheat leftover food to 165°F or until boiling.	56%	80%
Employees use a thermometer to check foods for proper holding temperatures.	34%	72%
Employees always cool large quantities of foods in shallow containers.	35%	71%
Employees never thaw foods at room temperature or on the counter.	49%	77%
<i>Outcome Indicator: Training and encouraging employees to use proper hand washing procedures</i>		
Employees was their hands with soap and water for 20 seconds.	41%	74%
Employees was their hands with soap and water for 20 seconds after handling raw meat or poultry.	37%	76%
<i>Outcome Indicator: Adopting practices to prevent cross contamination</i>		
Employees never use the same cutting board for preparing all types of food.	45%	78%
Employees wash and sanitize cutting boards after using them for raw meat and poultry.	79%	94%
<i>Outcome Indicator: Using proper cleaning and sanitizing Procedures for equipment, utensils, and food preparation</i>		

surfaces

Employees always follow recommended practices when washing and sanitizing food preparation equipment and surfaces.

65%

86%

Outcome Indicator: Adequately labeling foods upon receipt and during storage

Employees follow recommended practices during labeling foods upon receipt and during leftover storage.

46%

80%

C. Source of Federal Funds

Smith-Lever and State Matching

D. Scope of Impact

Multi-State Extension – WS, OH, CO

Integrated Research and Extension

Texas 1890 Extension

Impact - There were 682 individuals that participated in the food safety/food borne illness workshops. A total of 609 of these individuals reported adopting sanitation practices, washing hands thoroughly before and after handling foods, and 243 adopted safe and healthful food selection and preparation practices. There were 70 volunteers involved with the workshops. Overall, participants learned how to keep their families safe from the risks of food-borne illness.

1. Source of Funds - United States Department of Agriculture, Food and Nutrition Program through the Texas Department of Human Services, CSREES (EFSQ-POW), Smith-Lever, Section 1444 and State Matching Funds.
2. Scope of Impact - State Specific

Tennessee Combined Research and Extension

Impact:

Of the 91,235 adults and youth who received food safety education, 71,342 planned to adopt or adopted one or more food safety practices. More than 41,000 washed their hands before and after handling food, 14,972 cleaned surfaces and utensils that came in contact with food, 8,814 purchased safe food, 17,264 cooked food to safe temperatures, 27,638 refrigerated perishable foods within two hours, 3,475 thawed frozen foods using recommended practices and 16,491 preserved food safely. If 856 to 1,498 of the 71,342 individuals (based on a national percentage of 1.2 to 2.1 percent of individuals who contract foodborne disease annually) who planned to adopt or adopted one food safety practice did not contract a foodborne illness, the potential savings for Tennessee would be \$171,200 to \$9,262,134 for FY2000.

Funding Source:

Smith-Lever, State, EFNEP (CSREES Smith-Lever 3(d) funds)

Scope:

State Specific

Puerto Rico Extension

Three hundred and seventy-five (375) dairy workers were taught how to reduce antibiotic residues in milk.

Impact – Three hundred and sixty (360) dairy workers actually adopted a practice.

Source of Federal Funds – Smith Lever 3(b), 3(c) Funds

Scope of Impact – State Specific

Ohio Combined Research and Extension

EFNEP

- 52 percent (1,237 participants) of homemakers showed improvement in one or more of the food safety practices (i.e. thawing and storing foods properly).
- 16 percent (389 participants) of homemakers showed improvement in both of the food safety practices (i.e. thawing and storing foods properly).

FNP

- Number of fact sheets distributed
74,328
- Number of educational sessions held with two or more participants
929
- Number of participants attending presentations and/or demonstrations 16,497
- Number of participants who learned new information 10,068 (61%)
- Number of participants who plan to make recommended changes 7,546 (46%)
- Number of participants who are now using recommended practices 5,900 (36%)

New York Combined Research and Extension

Food safety improvements (defrosting in the refrigerator instead of the counter, proper storage, handling and following temperature guidelines; a general improvement in cleanliness and sanitation practices-particularly critical with children in the household):

- 98% of the 80 families who participated in Food Safety program were able to identify correct practices in all areas of food safety and sanitation after completing a four-week interactive program.
- 15 participants shared specific practices learned in the program with neighbors and friends
- Parent Aides reported assisting over 100 additional low-income families to improve food safety behaviors.
- Food resource, budgeting, meal planning and diet quality improvements

- 25 residents of a Chemical Dependency Rehabilitation Program achieved the following life skills improvement after engaging in 10 sessions of CCE Nutrition education programs.
- 27% were able to plan meals in advance and shop with a list
- 55% improved diet quality by using the "Nutrition Facts" label to make healthier food choices
- 64% demonstrated the ability to practice safe food handling and preparation behaviors.
- 36% reported eating regular meals with attention to diet quality-a practice that was a "first" in their lives.
- 55% reported "increased confidence in their ability to adapt recipes to meet their special needs and preferences".(Many previously had never even followed a recipe.)

New Jersey Combined Research and Extension

Activity: Research shows that there are gaps between the research, knowledge and practices that promote a safe food supply. Research also supports that food handlers who improve the way they prepare, thaw, and store food can reduce contamination and, likewise, risk of outbreak of foodborne illness.

It is vital that food handlers know the facts behind foodborne illness and safe food handling practices if we are to reduce the risk of foodborne illness. The **Food Safety for Food Servers** curriculum gives New Jersey FCS Educators a tool to teach commercial and/or noncommercial foodservice workers the safe food handling practices that will reduce the incidence of foodborne illness. Food Safety for Food Servers targets food handlers in both commercial and noncommercial settings, such as senior feeding programs, soup kitchens, youth groups and clubs, 4-H club members and volunteer leaders, fast food restaurants, civic associations, or houses of worship that offer meals or feeding programs, etc.

Impact: This two-hour program was presented to 357 people in Monmouth, Mercer and Somerset Counties in New Jersey. Respondents to follow up evaluations reported at least one behavior change as a result of the session:

1. 23% use a sanitizing cleaner on cutting boards, counters, and utensils
2. 90% check the "use by" date on packages to be sure it hasn't expired
3. 92% place raw meat, fish, and poultry on plates before refrigerating so juices won't drip
4. 44% refrigerate or freeze leftovers immediately, not letting them cool on the counter first
5. 89% date all leftovers before freezing or refrigerating

Food Safety for Food Servers has been well received by extension staff and program participants.

Source of Funding: Smith-Lever (b) & (c) & (d), State Funds

Scope of Impact: **State Specific**

Nebraska Extension

Since 1994, University of Nebraska Cooperative Extension has offered ServSafe training to an estimated 6,000 food service managers in Nebraska. Extension teams with the state departments of agriculture and

health and human services, as well as the Nebraska Restaurant Association to offer the program statewide to teach participants safe food handling procedures. ServSafe's success prompted extension to coordinate new training for cooks and wait staff beginning in 1998. In one set of counties alone, 100 people representing full-service steakhouses to take-out pizza parlors took the training.

6. Impact - statewide, at least 95 percent of ServSafe participants pass a national certification test following training. Managers report increasing their knowledge of safe food handling techniques that can reduce the risk of food borne illness by an estimated 33 percent. Managers report more conscientiousness about food temperature, cleaning and hand-washing. Each manager, in turn, is estimated to teach the food safety information to another 15 people, greatly extending extension's efforts.

7. Scope of Impact - State Specific

Nebraska Extension

Food Safety for Churches, Caterers and Organizations, was a program taught by an Extension Educator and held in West Point and Tekamah was attended by 79 caterers, food service staff and members of organizations who serve food. Personally, the Educator has observed changes made at a Wisner, Nebraska church. For their 1998 bazaar, the ladies canned 360 pints of jellies, jams and salsa, hot water processing all of them in proper canning jars for the first time. Also at funeral dinners, they are very careful – all workers wear plastic gloves, all dishes are rinsed in a sanitizing solution before drying, and NO spoons are moved from one dish to another without first being washed. In fact, one member is vocal about the way foods are served in public settings encouraging those in charge to take the proper precautions and serve foods safely.

8. Impact - 1,660 people are impacted daily, with safer food served in schools, hospitals and rest homes in our area, as a result of the food service staff who attended.
 - 33% of the participants responded to the six month retrospective pre- and post-test indicating that they made statistically significant changes in knowledge/behaviors (at the p.05 level) including:
 - monitoring temperatures of foods,
 - causes of food borne illnesses,
 - storage of food practices,
 - personal hygiene practices
 - and the preparation and processing of foods.
 - Participants listed that the greatest changes in behaviors were related to sanitation, hand-washing, monitoring temperatures of foods, use of sanitizing solutions, wearing plastic gloves when serving and handling foods and preparing and processing foods safely. The one third of the participants responding have used the knowledge they gained at 119 events in the six months since the workshop.

c) Scope of Impact - State Specific

North Carolina Research

As consumers become more aware of food-safety issues, producers are challenged to find new ways of ensuring that their food products are the safest, highest quality that money can buy. Cooling eggs quickly after they are laid is one way to ensure quality and a longer shelf life. But with traditional refrigeration methods, it can take seven to 10 days to reduce the internal temperature of eggs to 45 degrees F., the optimal temperature required by the U. S. Department of Agriculture. Researchers at North Carolina State University have developed a method of cooling eggs cryogenically that dramatically reduces the time needed to lower their temperature. Eggs are graded, washed and placed in cartons, then pass through a 15-foot cooler in 90 seconds. The cooler is filled with carbon dioxide gas at a constant temperature of minus 60 to minus 90 degrees F. The process reduces the cooling time for eggs from days to a matter of minutes.

- d) Impact - By rapidly cooling eggs, producers can further reduce consumer's risk of contracting *salmonella enteritidis* from eggs. In addition, the process increases the shelf life of eggs from 30 to 60 days, increasing opportunities for exporting eggs and reducing producers refrigeration costs while enhancing overall egg quality. The process is commercially available to producers.
- e) Source of Funds - Hatch, State
- f) Scope of Impact - National

North Carolina Extension

- a. NCCES programming addressed two of the six priority areas in the 1997 National Food Safety Initiative -- (1) coordination of food safety activities between the private sector, academia, and regulatory agencies, and (2) education of food handlers. The foodservice industry is the second largest retailer in NC employing over 250,000 people. According to the Centers for Disease Control and Prevention, nearly 50% of all reported foodborne illness outbreaks are attributed to unsafe food handling practices occurring in foodservice operations. To address this problem, 45 counties have been offering the nationally recognized ServSafe: Serving Safe Food program. ServSafe is a nationally recognized certification program developed by the Educational Foundation of the National Restaurant Association.
- b. Impact - In 2000, 2,591 foodservice managers completed 71 county-based programs and 2,105 food handlers completed 746 classes. Of those completing these programs, 1,992 service workers and 2,159 food handlers adopted safe food handling practices.
- c. Scope of Impact - State Specific

Montana Extension

Brief Description:

Extension professionals train and supervise paraprofessionals and volunteers who teach basic nutrition and food skills to limited resource families and youth via one-on-one home visits and/or group classes through an in-depth series of lessons. EFNEP works to achieve lasting improvements for families while promoting immediate changes in food habits. In the last year, Montana EFNEP is operating in four counties encompassing parts of three reservations: Big Horn, Blaine/Fort Belknap, Missoula, and Yellowstone.

Impact/Accomplishments:

In the adult program, over 92% of the participants improved their diets, in one or more areas of the Food Guide Pyramid. Utilizing the Behavior Checklist Survey, 77% of the adults who completed the program improved in one or more food resource management practices; 87% improved in one or more nutrition practices with their families; and 53% improved one or more food safety practices.

Source of funding:

Federal 3D
Other grants

Scope of impact:

Five other rural states in collaboration

Montana Extension**Brief Description:**

Montana FSNEP (Food Stamp Nutrition Education Program) provides educational programs for food stamp households or those eligible. In 31 counties, paraprofessionals provide a series of lessons or single demonstrations with practical information and skill building tips for choosing better foods, food handling, food storage and food safety practices.

Impact/Accomplishments:

Over 13,000 Montanans (adults, senior citizens, and youth) were directly contacted by FSNEP in FY 00. Some participants completed a series of lessons, while some participated in one or more lessons or demonstrations focused on improving food skills. An additional 25,000 indirect contacts were made by the program offering Montanans information through newsletters and displays. Adults who completed the lesson series reported that they improved one or more food resource management practices, improved nutrition practices, as well as food safety practices. 81% of youth who participated improved their practices in food preparation and food safety.

Source of Funding:

Federal grant

Scope of Impact:

State specific

Arizona Combined

a. Safe Food 2000 is a multi-year project focusing on education in food safety with the general public, school food service staffs, group home staffs, food banks and other community groups. The ultimate goal is to reduce Food borne illness in Arizona and to increase safe food handling practices, from the field to the consumer's plate. The program uses a broad array of both written information and workshops delivered in several counties in Arizona. Workshops include Master Consumer Adviser volunteer training, food safety education classes, EFNEP (Extension Food and Nutrition Education Program) classes, Safe Food Handling for the Occasional Quantity Cook, Train the Trainer for 70 volunteers and

local classes, and an annual Food Safety from the Farm to the Table Conference. Information services include 800-number food safety hotlines, weekly news columns on food safety in a Phoenix newspaper, and Safe Food Weeks, when food safety information packets are delivered to print and broadcast media for dissemination to the public.

b. Impact - More than 2000 low income families annually have attended EFNEP classes in Arizona. Of these, 93% have made positive changes in their food behaviors, and 52% improved safe food practices, according to follow-up surveys. Safe food practices result in reduced medical costs and fewer lost work days. Similar results occurred with school and institutional food service staffs. In a six-month follow-up survey with participants, 95% reported improvement in at least one safe food practice due to the training, with a 30% increase in safe food practices. These changes affected more than 200,000 children or at-risk adults. As the program spreads, the total potential number of elementary students affected by food lunch practices in Arizona would be more than 562,000 children. Food service personnel are constantly changing, so ongoing education is critical. Extension volunteers and staff have trained more than 300 community quantity cooks in safety practices.

c. Source of Federal Funds - Smith-Lever 3(d)--EFNEP

d. Scope of Impact- Local

Northern Marianas Combined

“Through collaborations with the 4-H program, the Nutrition Assistance Program (NAP), the Public School System, and the Department of Public Health, EFNEP and the Nutrition, Diet and Health program has reached over 1500 families throughout the CNMI in the last year. In addition, there was about 70 youth and families with young children throughout the CNMI enrolled in EFNEP. According to the EFNEP evaluation report, more than 75% of the graduates showed improvement in one or more food resource management practices such as planning meals, comparing prices, using grocery lists, and not running out of food or cutting children’s meals because there was not enough money to prepare them. Meanwhile, 86% of the graduates demonstrated acceptable food safety practices such as thawing or storing food properly. Also, over 85% of youth from the pilot project *The Summer Youth Program* (SYP), demonstrated the ability to wash hands properly, to avoid cross-contamination, and to use temperature control when handling food.”

Colorado Extension

ENP Adult Food Safety Outcomes

During the 1999-2000 reporting year, 2,241 limited-resource adults received food safety education through the Colorado Extension Nutrition Programs (ENP). Outcomes from completed entry & exit paperwork showed:

- 55% of ENP participants more often thaw frozen foods correctly;
- 38% of ENP participants more often refrigerate perishable foods correctly.

ENP Youth Food Safety Outcomes

Additionally, ENP reached 2,991 low-income youth in the 1999-2000 reporting year. This was accomplished by 146 youth groups that met an average of six times each for a total of approximately six contact hours per participant that include food safety education.

Evaluations on samples of groups showed the following impacts:

--64% improved their food safety practices (primarily hand-washing).

Key Theme - Food Handling

Washington Extension

a. *Queso fresco* is a type of fresh cheese traditionally made with raw (unpasteurized) milk. WSU developed recipes for pasteurized-milk *queso fresco* for home production and for commercial production. These recipes have been widely used and rates of foodborne illnesses have decreased in the areas where Hispanic grandmothers (abuelas) have conducted safe cheese workshops to demonstrate the pasteurized milk recipes.

b. Impact: More than 800 people learned to make the WSU-modified recipes. In a previous year's survey of safe cheese workshop participants, we found that 100% of those who were re-contacted 6 months after attending a workshop were using pasteurized milk to make *queso fresco*. To further expand the outreach, a video *Fresh Cheese made Safely in Your Own Kitchen* was produced and is available for purchase. Several small vendors of *queso fresco* (who were previously unlicensed) have received assistance to enable them to become licensed and develop a business whereby they can legally sell pasteurized-milk *queso fresco*.

Utah Combined Research and Extension

Brief Description: USU's Food Safety Managers Certification Course is offered statewide on a quarterly basis. Food safety managers who participate in this course have a very high success rate in passing the food safety certification examination as part of the course.

Impacts: Food poisoning from public food establishments has been on the rise in Utah in recent years; however, according to state statistics, the rate of food poisoning is on the decline because of mandatory training and mandatory certification. Utah State University's teamwork with the Utah State Department of Health has paid off. During the four quarters when exams were given in 1999-2000, 81% - 100% of county food safety managers successfully passed the examination and earned the required food safety certification.

Source of Funds: Smith Lever

Impacts: UT

New Jersey Combined Research and Extension

Activity: Between 1988 and 1992, outbreaks of foodborne illness caused an annual average of more than 15,000 cases of illness in the United States, as reported to the Centers for Disease Control and Prevention. The actual illness rate may be higher because a count is taken only when the microorganism that caused the illness is identified by a laboratory and reported by a physician.

When unreported cases are taken into account, an estimated 76 million illnesses, 325,000 hospitalizations and 5,000 deaths each year may be associated with microorganisms in food. Hospitalization due to foodborne illnesses are estimated to cost over \$3 billion each year. The cost of lost productivity is estimated at between \$20 billion and \$40 billion each year. In addition to acute illness, some microorganisms can cause delayed or chronic illnesses.

To address this critical issue, Extension educators surveyed NJ WIC clinics regarding the level and priority of food safety education with parents of infants and young children. Survey results revealed that few routinely provided this information to their clients because quality information and instructional materials were not available. Once hundred percent of surveyed NJ WIC clinics responded favorable to the suggestions that instructional materials on these topics should be made available to their clients.

Extension educators developed behaviorally focused food safety curriculum and supported instructional materials to educate caregivers of infants and young children on safe food handling practices. The project, which has resulted in a state-approved food safety curriculum, three RCE fact sheets, and support posters, targets low-income caregivers.

Impact: This program reached 21 women through six presentations in Gloucester County. All sessions were held in cooperation with local WIC clinics. All women involved have been informally surveyed on an individual basis to determine what improved practices have been adopted as result of the program. Those improved practices include:

- .. Inspecting formula packages and “use-by” dates prior to purchasing
- .. Sanitizing bottles and kitchen surfaces prior to preparing baby bottles
- .. Refrigerating infant formula immediately after preparing
- .. Discarding unused prepared formula after 48 hours
- .. Feeding warmed formula right away
- .. Thawing frozen breast milk in the refrigerator
- .. Using an insulated bag with ice or cold pack to keep infant formula cold

Source of Funding: Smith-Lever 3(b) & (c), USDA-CSREES Food Safety and Quality Initiative Grant, State FDA Grant.

Scope of Impact: State Specific

New Hampshire Extension

- a. Food safety programs address food safety needs from farm to table and help ensure a safe food supply by training food workers. Food service workers and managers learn to think critically about and make choices between safe and risky food handling practices. The Safety Awareness in the Food Environment (SAFE) program was developed to provide food managers in New Hampshire and Vermont with research-based information about food sanitation and handling. The program includes the Risky Business newsletter and a two-hour food safety and sanitation workshop for food workers and managers.
- b. Impacts - This past year the Risky Business newsletter was distributed to every licensed food service facility in the state - approximately 4,000 sites. Seventy-five percent increased their overall knowledge base of food handling practices. Seven hundred seventy food workers attending a SAFE workshop adopted at least one safe food handling practice.
- c. Source of Funding - Smith-Lever 3b&c, State matching funds

- d. Scope of Impact - Multistate Extension (NH, VT)

Illinois Combined

According to the National Restaurant Association, the **average** foodborne illness outbreak costs a single business \$75,000 including lost business, medical costs and litigation. As of 1999, Illinois requires certified food service sanitation managers to attend a minimum of five hours of training to retain their certification. In the past 12 months, 1,312 foodservice staff have been re-certified through refresher courses taught by University of Illinois Extension Educators. These courses have done more than meet a minimum re-certification requirement; over 79 percent reported improving one or more food handling practices as a result of the training. Since many establishments have only three or four certified employees, one can assume that this training has impacted more than three hundred twenty-five establishments (assuming four persons trained are equivalent to one establishment.) As of February 2001, Extension Educators are training an average of more than 100 commercial food handlers per month.

- e. Impacts – 1,312 food handlers improved one or more food handling practices.
 - More than 325 food establishments now serve safer food.
- c. Source of Funds – Smith-Lever, state.
- d. Scope of Impact – Illinois.

Key Theme - Foodborne illness

Wisconsin Research

The issue: The food-borne pathogen *E. coli* O157:H7 was discovered in 1982 after an outbreak linked to contaminated hamburger. It causes an estimated 75,000 illnesses a year in the United States, including numerous deaths, and is especially dangerous to children, the elderly and people with impaired immune systems. Preventing outbreaks is extremely important because there are no effective treatments for the bacterium and just a few *E. coli* O157:H7 cells can cause illness. Knowing the pathogen's genetic code would provide insights into how to fight it.

What's been done: A UW-Madison team completely sequenced the disease-producing bacterium's genes. They then compared it with the genome of *E. coli* K-12, a benign *E. coli* strain sequenced in 1996 by UW-Madison Genome Center Director Fred Blattner. The two strains of *E. coli* share about 3,500 common genes. However, *E. coli* O157:H7 has 1,300 genes not found in *E. coli* K-12, and the benign strain has 530 genes not found in O157:H7. The team discovered "islands of pathogenicity" across the genome that viruses may have transmitted from other bacteria to O157:H7. The finding suggests that there may be a large bank of genes that are exchanged across an entire family of bacteria, including related organisms such as *Salmonella*, *Shigella*, the Plague-causing organism *Yersinia*, and the plant pathogen *Erwinia*.

The impact: The genomic sequence of *E. coli* O157:H7 reveals that the bacterium has a surprisingly wide range of genes that may trigger illness. These provide researchers with new genetic markers, which they can use to detect and monitor food-borne outbreaks. Comparing the benign and pathogenic genomes also gives scientists a set of targets for future work on drug treatments and human vaccines.

North Carolina Research

Fresh eggs can be contaminated with *Salmonella enteritidis*, a microorganism proven to sicken people. Researchers at NCSU have developed a low-temperature, long-time water immersion heat treatment that produces salmonella free eggs.

- g) Impact - *Salmonella*-free eggs may be used to make safe soft-boiled, soft-poached or sunny side-up fried eggs. Such pasteurized eggs may also be used safely in custards, Caesar salad dressing, ice cream, eggnog and sauces such as hollandaise sauce. Eggs processed using this technology were first test marketed in 1996. Michael Foods of Minneapolis is now using the technology in a Nebraska egg processing plant, which has an annual production capacity of 2.5 million dozen eggs. Eggs from this plant are being sold in Minnesota, South Dakota and Wisconsin. Based on the original research done at North Carolina State University, the egg pasteurization process received official FDA approval April 1, 1999. The process was noted in a report produced by the President's Council on Food Safety (Egg Safety Action Plan) as a viable processing option for assuring the safety of eggs. Additional marketing opportunities for pasteurized eggs are anticipated in the near future pending the approval of the product by two fast food chains. On the international front, Michael Foods is seeking to establish a joint venture with a European Union egg producer and processor to begin marketing pasteurized eggs to a major European Union supermarket chain.
- h) Source of Funds - Hatch, State
- i) Scope of Impact - National

Arkansas 1890 Combined

Situation - Food-borne illnesses are a major health and wellness problem. Consumer mishandling of food during storage and preparation contributes to millions of cases of food-borne illnesses annually. This is especially true of low-income families. A comprehensive program on food safety education can prevent contamination which causes food-borne illnesses.

The FF-NEWS Program is a multistate partnership involving the University of Arkansas at Pine Bluff, Southern University and A & M College (Louisiana), Langston University (Oklahoma), Prairie View A & M University (Texas), South Carolina State University, and Lincoln University (Missouri). It is designed to help food stamp recipients and other low-income families select and prepare meals consistent with their cultural traditions while improving their family's overall health. FF-NEWS Staff made 484 contacts with local agencies for the purpose of developing partnerships, increasing client participation, securing resources and technical experts to serve as guest speakers for the program.

Impact(s) - The major impact of the program has been increased awareness of food-borne illnesses and increased knowledge of appropriate food handling and storage techniques. The staff conducted 180 in-depth educational sessions for food stamp recipients related to food safety and management practices; conducted 30 point-of-purchase demonstrations at local grocery stores and farmers markets; used 145 educational exhibits (prepared by staff and program participants) at county fairs, commodity distribution centers, faith-based organizations and medical clinics for program awareness. These exhibits attracted a number of potential clients of which 3,221 asked for additional information. The food safety classes reached 1,800 participants. One thousand four hundred four (1,404) participants reduced health risk-factors through developing food safety practices. Multi-county agents conducted grocery store tours to teach participants how to keep food safe when shopping as an essential way to prevent food borne illnesses and promote food safety.

Key Theme - HACCP

Wisconsin Extension

The primary focus of food safety training for food processors/food industry personnel in 2000 was HACCP and related programs such as validation of critical limits, better process control school for canning industry personnel, microbiological testing and intervention strategies against foodborne pathogenic microbes. A total of 937 people representing 59 processing plants, two state agencies (DATCP and DHFS), and the Federal Food and Drug Administration received training. Extension personnel provided training to 16 facilities that implemented HACCP in 2000.

Evidence of compliance with government regulations and specific training programs as a result of training were documents. Wisconsin's meat plants have outperformed the national average for prevalence of salmonella on carcasses and in certain ground products. Training was developed to enable meat and poultry processors to scientifically validate key components of their HACCP plans in response to emerging emphases of the U.S. Department of Agriculture and the Wisconsin Department of Agriculture, Trade and Consumer Protection. Training at the Better Process Control School is required by the U.S. Food and Drug Administration for personnel overseeing critical operations in canning plants. This training is essential for Wisconsin vegetable processors to continue their large production of canned vegetables.

Washington Extension

a. WSU has a focus on food safety from farm to table; thus we conduct a wide range of programs that fit under this theme. Our target audiences include producers and processors of meat, poultry, milk, and fresh produce; seafood processors; food service managers and workers; home preservers; health department inspectors and Food Safety Advisor master volunteers.

b. Impact: More than 35,000 people received information regarding the safe production of food at home and commercially, with about 20% (7000) of these people participating in an in-depth training (ServSafe, Food Safety Advisors, HACCP workshops, Quality and Safety Assurance programs). Of the 7000 who received in-depth training, it is estimated that 90% gained knowledge about protecting the safety of foods. When certification tests were given, the pass rate was very high, at least 90%. Between one-fourth and one-third of participants made behavior changes in their customary food practices to protect safety of food.

Virginia Combined Research and Extension

A statewide training program for food processing plant employees in Virginia was conducted in the areas of Hazard Analysis and Critical Control Point (HACCP) programs, Good Manufacturing Practices (GMPs), and foodborne hazards. Among the 419 participants, there was a 30% increase in the number of participants who could understand the purposes of HACCP and who could accurately identify potential foodborne hazards during processing.

Puerto Rico Extension

A total of 1,850 participants completed the course. A ten home economists worked in this project (FTE=3.5).

Impact – Ninety-eight (98%) of participants auto-evaluated themselves and all adopted the majority of the food handling practices related to HACCP as staged in the 1999 Food Code. The main practices adopted by participants were:

- Refuses perishable foods over 45°F during receiving.
- Facility has equipped hand-washing station available to employees.
- Employees washing their hands often.
- Disinfecting of work surface in contact with foods before food preparation and service.
- Facility has separate cutting table and utensils for meat and for vegetable and fruit.
- Compliance with cross contamination avoidance.
- Food Service facilities HACCP records. Demonstration of food temperature monitoring makes corrective action when deviations occur and keep records.
- Maintain hot food to 140°F or more.
- Used measure to cool hot foods quickly to lower from 140°F to 70°F in two hours and to 41°F in four hours.
- Keep pest management program.

Source of Federal Funds – Smith Lever 3(b), 3(c) Funds

Scope of Impact – State Specific

Key Theme - Food Quality

Texas 1862 Research

Quality. They have documented decreased microbiological growth in cooked beef top round roasts containing three to four percent sodium lactate. Researchers also found reduced growth of four major food borne pathogens in beef with three to four percent sodium lactate. Research also found that positive beef flavors were enhanced and off-flavor development was suppressed when two to four percent sodium lactate was added. Currently, researchers are assessing use of potassium lactate in fresh beef cuts for the retail market to improve food safety, shelf-life and palatability. Improved pork quality and consistency are influenced by genetic line and slaughter weight. However, as long as swine diets either meet or exceed NRC requirements for lysine, ham composition and lean meat quality are not affected by diet. Elastography has potential as an automated grading technology for pork, but additional image analysis techniques are needed before implementation.

Sodium lactate has been incorporated into almost all precooked meat products produced for delicatessen markets and luncheon meat markets. Results are being used extensively by the manufacturers and suppliers of sodium lactate to document safety and shelf-life extension. Meat producers use the research to develop new consumer products with assurance of safety.

c. Source of Federal Funds

Funds for this research are provided by USDA Small Business Association's Innovation Research Program, state and Hatch funds.

d. Scope of Impact

Integrated Research & Extension

South Carolina 1862 Extension

Interest continues to be high for information on a home-based food processing business.

Contact with food processing industry was done through workshops, industry meetings, and individual contacts with growers, shipper, or processors.

j) Impact –

A total of 271 educational programs were conducted reaching 2,174 commercial food processors. Of this total number, 1,460 report adopting or increasing uses of the recommended safety practices. Commercial food processing contacts or sites totaling 7,354 were advised of regulatory changes. There were 347 inquiries, 107 of who adopted a recommended practice for a new or value-added food product.

k) Source of Federal Funds – Smith Lever 3b&c

l) Scope of Impact – State

Pennsylvania Research

Impact/Accomplishment Statement: Improved point-of-sale appearance can lead to increased consumer acceptance at the retail level. Mushroom browning, which results from a variety of food handling sources, can be reduced by application of 0.3% calcium chloride to irrigation water. This

practice has become standard nearly throughout the Pennsylvania mushroom industry and is spreading to other operations throughout the United States and the world.

Mushrooms suffer from a lack of nutritional identity in the mind of the consumer. Research conducted under this project has demonstrated that minor changes in production practices could lead to the ability of mushroom growers to advertise mushrooms as a significant source of dietary selenium, a micronutrient implicated in reduction of many diseases, including certain cancers. Addition of selenium to mushroom compost supplements could permit producers to advertise mushrooms as an excellent source of dietary selenium (20 percent of the recommended daily allowance).

Staphylococcal food poisoning traced to canned mushrooms from China was due to bacterial growth and toxin formation prior to the canning process. The failure of high-temperature canning processes to destroy the toxin was unexpected and led to changed practices (improved worker hygiene, proper food handling, and compliance with good manufacturing practices) in the U.S. mushroom industry for pre-canning handling of mushrooms.

Identification of a natural antimicrobial compound in mushrooms has led to the potential for value-added products that could be obtained from off-grade mushrooms or waste products of mushroom production. This compound may be a useful preservative that could lead to new markets for mushrooms and contribute to overall food safety.

The latest in research outcomes from this project are shared at the annual Mushroom Short Course hosted by the Penn State College of Agricultural Sciences. At this Short Course, an average of 250 participants from ten states and six countries learn the latest in research results.

Sources of Funding: Hatch Act and State appropriated funds. This planned program also leveraged the appropriated funds by receiving a grant from AgInnovations LLC.

Scope of Impact: State Specific

Key Theme - Food Security

Tennessee Combined Research and Extension

Impact:

As a result of participating in the nutrition classes conducted by the University of Tennessee Agricultural Extension Service Family and Consumer Science faculty, fifty-seven percent of the participants surveyed in the Tennessee Nutrition and Consumer Education Program (TNCEP) (n=3998) reported they plan to use emergency food services less often and fifty-seven percent surveyed (5,486) reported they plan to reduce the frequency of running out of food before the end of the month. Eighty-four percent of the adult participants (6495) in the EFNEP program improved practices in food resource management which included running out of food less frequently.

Funding Source:

Smith-Lever, State (including Tennessee Department of Human Resources Community Block Grant and EFNEP (Smith-Lever 3d)

Scope:

State Specific

Puerto Rico Extension

Ten thousand eight hundred and seventy-six (10,876) consumers were contacted through community activities and 1,933 completed non-formal consumer education programs. About 131 volunteers were recruited, and of these 59 dedicated 622 hours to teaching clientele.

Impact: One thousand eight hundred and eighty-seven (1,887) persons that completed non-formal education and evaluations, adopted practices as follow:

- Select lower cost alternative foods of the same or increased nutritional value;
- Plan their meals;
- Compare similar items before purchasing;
- Make a shopping list;
- Make use of food specials;
- Use foods harvested in Puerto Rico or from home gardens.

Source of Federal Funds: Smith Lever 3(b), 3(c) Funds

Scope of Impact: State Specific

Colorado Extension

- 1) ENP adult participants will report saving money on their food bill;
- 2) ENP adult participants will report not running out of food by the end of the month

During the 1999-2000 reporting year, 2,241 limited-resource adults received food resource management education through the Colorado Extension Nutrition Programs (ENP).

Outcomes from completed entry & exit paperwork showed:

--A sub-sample of 41% of ENP participants reported saving an average of \$68.45 per month on their family food bill as a result of the program.

--37% of participants (809 families) reported they less often ran out of food by the end of the month.

Minnesota Extension

Many low-income families, especially those making the transition from welfare to work, do not have a secure food supply. Paying high rents and the high costs of utilities, transportation to work, child care, etc. all too often mean that there isn't enough money left to buy food, especially a sufficient quantity and variety that provides a balanced, nutritious diet. Helping individuals and families learn to stretch their food dollars so they can afford to eat properly and not run out of food each week or month is critical. Nutritional research has demonstrated over and over that inadequate, unbalanced diets are linked to low productivity and poor health over the long-term. Minnesota has two programs in operation that provide nutrition education to low-income individuals and families—the Food Stamp Nutrition Education Program (FSNEP) and the Expanded Food and Nutrition Education Program (EFNEP).

m) Impact

During 1999-2000, 90,781 households in Minnesota were receiving food stamps. FSNEP made over 772,000 information contacts with food stamp recipients/people eligible for food stamps (via distribution of informational materials) and nearly 72,000 developmental contacts (via brief teaching episodes). 27,237 persons, well over the target of 20,346, were taught all or some of the nutritional program (in a group, one-on-one, or via a staffed exhibit). Over 70% of the program participants (those who taught) were youth up to age 18, 16% were adults in families, and the remaining 13% were seniors 55+ years old. In terms of racial/ethnic group distribution, participants were 13% African-American, 6% Asian, 65% Caucasian, 11% Hispanic, and 5% American Indian.

From 19% to 29% of FSNEP participants during 1999-2000 improved their food security (19% of the seniors, 22% of the youth, and 29% of the adults). From 32% to 41% changed their food shopping behavior (32% of the seniors, 32% of the adults, and 41% of the youth). Between 22% to 54% of the program participants changed one or more food safety behaviors (22% of the seniors, 32% of the adults, and 54% of the youth). In terms of improving diet quality, from 34% to 44% of program participants reported at least one positive change (34% of the adults, 37% of the seniors, and 44% of the youth).

EFNEP enrolled 2,896 new families during 1999-2000, bringing the total number in the program to 3,311. These families included 10,343 persons, a high percentage of them children 8 years of age and younger. Over half of the EFNEP participants also were enrolled in one or more other food assistance programs. Fifty-six percent of the EFNEP homemakers completed the program during 1999-2000; 32% dropped out and 13% were still in the program at the end of the fiscal year.

Although the impact of FSNEP and EFNEP in Minnesota hasn't been precisely measured, it is clear from evaluation studies in other states that the benefits of these programs are far-reaching, both in terms of improved health of participants and potential cost savings in Medicaid, Medicare, and other health-related public assistance.

References:

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=821>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=822>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=1378>

<http://www.extension.umn.edu/mnimpacts/impact.asp?projectID=286>

n) Source of Federal Funds: Food and Nutrition Service, U. S. Department of Agriculture, through the Minnesota Department of Human Services Food Stamp Program.

o) Scope of Impact: State Specific

However, most accomplishment statements for the subject areas seem to focus more on activities, outputs and potential impacts rather than the real results (impacts) of these activities. The following example illustrates this point:

Key Theme – Food Resource Management

Wyoming

(Based on *Cent\$ible Nutrition Program [CNP]*, University of Wyoming [UW] CES's food and nutrition program for limited resource audiences that combines EFNEP and the Food Stamp Nutrition Education Program [FSNEP]; in FY00, CNP educators in 18 of 23 counties and 1 reservation office worked with 1083 households representing 3,204 people enrolled in a lesson series, and 17,033 persons participated in one-time lessons)

- a. Educators helped clients learn to plan meals, compare prices, use grocery lists, and provide food for the entire month.
- a. Impact - Households averaged a savings of \$40.00 per month on groceries. 84 percent of homemakers showed improved in one or more food resource management practices. On entry surveys, 25 percent of participants demonstrated acceptable practices, in contrast to 58 percent on exit surveys. Sample success story: "I have learned how to feed my family more nutritiously, and I have cut \$100 (at least) per month from our grocery bill. Thank you."

New York Combined Research and Extension Food Stamp Nutrition Education Program

Program goal is to enable Food Stamp recipients and applicants to make informed choices, which will support optimal nutritional health, physical, mental health, and well being through maximization of all resources.

Four part-time nutrition teaching assistants targeted working poor and elderly who are either receiving food stamps or are eligible to receive food stamps in all parts of the county including the Old Forge area. Delivery methods included home visits, group sessions at community centers and worksites, along with newsletters and exhibits at community events.

Eighty-four participants were enrolled in on-on-one home visits and received 523 home visits. 87 participants were enrolled in structured groups. 3358 additional persons were reached through unstructured groups such as WIC clinics, food pantries, Herkimer County Employment and Training workshops, Parent Education Resource Center classes, senior citizen groups, newsletters, and health fairs.

Overall results have been positive. Based on evaluation of graduated participants receiving home visits or enrolled in group work, 89% showed improvement in one or more food resource management practices (i.e. planning meals, comparing prices, not running out of food, or using grocery lists). 65% more often planned meals in advance and 32% less often ran out of food before the end of the month. 88% of participants showed improvement on one or more nutrition practices (i.e. planning meals, making healthy food choices, etc.): 42% improved in serving more fruit and 44% improved in serving vegetables. 59% of participants showed improvement in one or more of the food safety practices (i.e. thawing and storing foods properly). 55% more often followed the recommended practice of not thawing foods at room temperature.

Nebraska Research

Issue: (Who cares and why?)

Creating new jobs and diversifying economic opportunities are keys to maintaining Nebraska communities and quality of life. Entrepreneurs and established food processors get help adding value to the state's abundant livestock and grain from the University of Nebraska's Food Processing Center.

What has been done?

NU's Food Processing Center is a one-stop source of food safety, problem-solving, product development, and technical and business information for entrepreneurs and existing food processors. For example, its Nebraska Custom Processing Network matches Nebraska food processors that have excess plant capacity with companies that need custom or contract production, helping outside processors and Nebraska companies produce food more profitably. The center handles more than 3,000 inquiries annually for this program alone, which it operates in cooperation with the Nebraska Food Industry Association. The center was the first of its kind when it opened in 1983 and became a model for other universities.

Impact:

Nebraska's food processing industry has grown from 220 food processing businesses when the center opened to nearly 400 today. NU Food Processing Center officials estimate that the center's programs and services add an estimated \$12.5 million annually of economic value to Nebraska's economy. One company manager said the center's expertise helped the company increase sales by \$250,000, reduce operating costs by 7 percent, create 12 new jobs and invest \$100,000 in new capital projects.

The center's Custom Processing Network has generated more than \$11 million of additional business for Nebraska processors and contributed to 11 plant expansions and four plant relocations to Nebraska.

Funding:

U.S. Department of Commerce
USDA special appropriation
Private sector funding
NU Cooperative Extension
NU Agricultural Research Division
Hatch Act

Summary:

The University of Nebraska's Food Processing Center offers technical and marketing/business development assistance to entrepreneurs and established food processing firms that has helped Nebraska's food processing industry grow from 220 food processing businesses in 1983 to nearly 400 today. Center officials estimate its programs and services add about \$12.5 million of economic value to Nebraska's economy annually. One company manager said the center's expertise helped his company increase sales by \$250,000, reduce operating costs 7 percent, create 12 new jobs and invest \$100,000 in new capital projects.

Key Theme - Foodborne Pathogen Protection

Kentucky Combined

The most susceptible individuals to foodborne pathogens are the elderly and school-age children. To address these concerns, educational programs on the safe preparation and handling of food were sponsored by the Cooperative Extension Service. 11,117 youth and 279 seniors participated in Kids in the Kitchen, Food Safety and Sanitation and other food safety related programs. On average, 95% of the participants report they will make behavioral changes as a result of newly learned food preparation and safety skills. After many of the programs involving children ended, students were heard singing the song suggested for the proper length of time while washing their hands; proof that food safety can be fun as well as life changing.

Source of Federal Funds: Smith-Lever

Scope of Impact: State-Specific